

Notice of Allowability

Application No.

09/914,208

Examiner

Kaj Olsen

Applicant(s)

CRAMER ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment of 2-6-04 and the interview of 4-8-04.
2. ☒ The allowed claim(s) is/are 4-7.
3. ☒ The drawings filed on 06 February 2004 and 30 November 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 8/25/03
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 4-8-04.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Walter Ottesen on 4-8-2004.

The application has been amended as follows: Claim 4 was amended as follows:

4. (Twice amended) A method for operating a sensor for determining the concentration of oxidizing gases in gas mixtures and especially for determining the nitrogen oxide concentration in exhaust gases of an internal combustion engine, the sensor including: a first chamber disposed in a solid state electrolyte, the chamber being connected to the gas mixture via a first diffusion barrier; a second chamber arranged in the solid state electrolyte and said second chamber having a pregivable constant oxygen partial pressure; an oxygen pump electrode subjected to the exhaust gas on the solid state electrolyte; a further oxygen pump electrode and [an NO] a nitrogen oxide pump electrode in said first chamber; and, an oxygen reference electrode arranged said second chamber; the method comprising the steps of:

applying voltages (U-IPE; U-O₂; U-NO) to the oxygen pump electrode, further oxygen pump electrode and nitrogen oxide pump electrode [electrodes], respectively, thereby generating respective pump currents;

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measuring one of said pump currents and outputting said one pump current as a measurement signal; and,

changing said voltages (U-IPE; U-O₂; U-NO), which are applied to the pump electrodes, in dependence upon factors which correspond to the characteristic resistances or conductivities between said electrodes, during operation of the sensor in such a manner that the voltages correspond to predetermined desired values in the interior of said sensor.

In claim 5, the term --and/or-- was inserted between "K5," and "K6".

Claim 7 was amended as follows:

7. (Amended) A method for operating a sensor for determining the concentration of oxidizing gases in gas mixtures and especially for determining the nitrogen oxide concentration in exhaust gases of an internal combustion engine, the sensor including: a first chamber disposed in a solid state electrolyte, the chamber being connected to the gas mixture via a first diffusion barrier; a second chamber arranged in the solid state electrolyte and said second chamber having a pregivable constant oxygen partial pressure; an oxygen pump electrode subjected to the exhaust gas on the solid state electrolyte; a further oxygen pump electrode and [an NO] a nitrogen oxide pump electrode in said first chamber; and, an oxygen reference electrode arranged in said second chamber; the method comprising the steps of:

applying voltages (U-IPE; U-O₂; U-NO) to the oxygen pump electrode, further oxygen pump electrode and nitrogen oxide pump electrode [electrodes], respectively, thereby generating respective pump currents;

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measuring one of said pump currents and outputting said one pump current as a measurement signal;

changing said voltages (U-IPE; U-O₂; U-NO), which are applied to the pump electrodes, in dependence upon factors which correspond to the characteristic resistances or conductivities between said electrodes, during operation of the sensor in such a manner that the voltages correspond to predetermined desired values in the interior of said sensor; and,

wherein said voltages (U-IPE; U-O₂; U-NO) are changed by adding voltages thereto which correspond to a feedback of voltage components weighted with factors (K1, K2, K3, K4, K5, and/or K6) which voltage components are proportional the sliding mean values of the voltages, which are proportional to said factors and which are formed by means of electric circuit elements and/or the derivatives of higher order and/or their sliding mean values or linear combinations thereof.

2. The following is an examiner's statement of reasons for allowance: The prior art does not disclose nor render obvious a method of operating a sensor for determining a concentration of oxidizing gases where the voltages applied to the various pump electrodes are changed in dependence upon factors which correspond to the characteristic resistances or conductivities between the electrodes.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

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fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 6:30 A.M. to 4:00 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Kaj Olsen', with a long horizontal flourish extending to the right.

Kaj Olsen Ph.D.
Primary Examiner
AU 1753
April 8, 2004